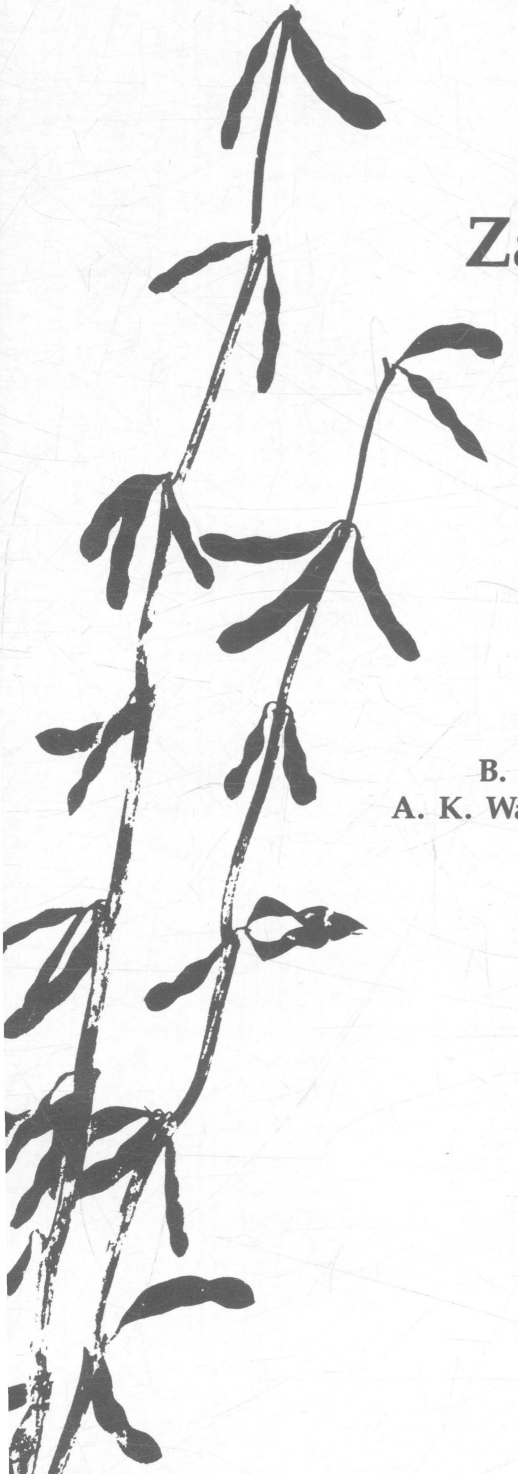
Special Circular 134 September 1989



Zane Soybeans

B. A. McBlain, S. K. St. Martin,
A. K. Walker and A. F. Schmitthenner

Ohio Agricultural Research
and Development Center
The Ohio State University
Wooster, Ohio

CONTENTS

Kirklyn M. Kerr
Director

9-89-750

Zane Soybeans

B. A. McBlain, S. K. St. Martin, A. K. Walker and A. F. Schmitthenner

Zane is a new, high yielding soybean variety which was officially released by The Ohio State University, Ohio Agricultural Research and Development Center, in 1984. Seed of Zane has been available to farmers since the spring of 1986. Performance data for Zane and comparable varieties or commercial strains are presented in Tables 1-6. Zane was previously designated as HW8033 in OARDC Agronomy Department Series No. 225, 1984.

Origin

Zane originated as an F_5 plant selection made in 1977 from the two-parent cross Cumberland x Pella which was made at the Isabela substation of the Puerto Rico Agricultural Experiment Station in December, 1975. The F_1 seed from the cross was also planted at Isabela and the later generations advanced by single seed descent at the Iowa Agriculture and Home Economics Experiment Station in 1976 and at Isabela in the fall and winter of 1976-77. The line was tested for seed yield in Ohio from 1978 to 1983, in the Uniform Soybean Tests, Northern States from 1981 to 1983, and in both trials as a high yield check under the name, Zane, since 1984. Seed of Zane was shared with foundation seed organizations in Iowa, Kansas, Kentucky, Missouri, Nebraska and South Dakota. In Ohio, 182 acres were seeded in the spring of 1984 at Ohio Foundation Seeds, Inc. to produce 5,153 bushels of Zane foundation seed. Zane was cooperatively released August 1, 1984 by experiment stations in Ohio, Iowa, Kansas, Kentucky, Missouri, and Nebraska.

Agronomic Performance

The data in Table 1 were used in support of the release of Zane and showed that it was much superior to Williams-type, 2 to 4 percent better than Pella, and equal to the later-maturing A3127 in yield potential. Zane was deemed worthy of release because it was earlier and/or higher yielding than varieties accounting for more than 50 percent of Ohio soybean acreage. Zane appeared to perform best at Western Branch, South Charleston, and poorest at Ohio Foundation Seeds (OFS), Croton (Table 2). Northwestern Branch, Custar and Ohio Department of Natural Resources (ODNR), Vickery sites have a history of moderate to severe phytophthora rot (*Phytophthora megasperma* f. sp. *glycinea* (Drech.) Kuan & Erwin) and Zane was 4 to 5 percent higher yielding at these sites, than either Williams or Pella which are considered to be relatively tolerant to the disease.

Regional data for the period 1981-1983 indicated that Zane yielded better than any public variety except Harper which was three to four days later in maturity and equal in yield (Table 3). Zane also performed better on average than phytophthora rot resistant varieties Century 84 and Williams 82.

Zane has continued as a check variety in breeding trials, regional tests, and commercial performance trials. Zane has continued to perform well in breeding trials compared to public varieties such as Pella, Harper and Williams 82 or commercial strains such as AP330, TS350 and A3127 (Table 4). In regional tests, Zane has been both a yield and maturity check in Maturity Groups II and III until 1987 (Table 5). As a public variety in the Ohio Soybean Performance Trials (OARDC Agronomy Series 212, J. E. Beuerlein, 1983-6), Zane has performed about the same as Century 84 or Pella and better than Sprite or Harper (Table 6). The commercial strains V311, GL3200, and A2943 yield slightly more than Zane but are two to three days later in maturity.

Characteristics

Zane has purple flowers, gray pubescence, brown pods at maturity, and dull yellow seed with imperfect black hila. It is an early maturity Group III soybean variety (Table 7) and it is best adapted to approximately 40^0 to 42^0 N Lat. It is approximately one day earlier in maturity, one inch shorter, and slightly more lodging-prone than Pella on average. It is a relatively short indeterminate variety three to four inches shorter than Amcor or Williams 82 on average; comparable in height to Pella, Harper, and Asgrow A3127. (Note, Harper is stunted by phytophthora rot in Ohio.) Only the semidwarf varieties such as Gnome 85 and Hobbit are appreciably shorter and more lodging resistant than Zane. Zane has relatively large seeds which have acceptable seed quality, average protein content and moderately high oil content (Table 8).

Disease Resistance

Zane was evaluated in Ohio and Regional Tests for field resistance or tolerance to phytophthora rot caused by *Phytophthora megasperma* f. sp. *glycinea* (Drech.) Kuan & Erwin (Table 8). Zane is susceptible to phytophthora rot but on average, it appears to be similar to Pella which is considered tolerant. Regional test data for other diseases (Table 9) show that Zane is resistant to bacterial blight [caused by *Pseudomonas glycinea* (Coeper)]. Zane is moderately resistant to race 2 of frogeye leafspot [caused by *Cercospora sojina* (Hara)] and purple seed stain [caused by *Cercospora kikuchii* (T. Masu. & Tomoyasan)]. It is susceptible to bacterial pustule [*Xanthomonas phaseoli* (E. F. Smith) Dawson var. *sojensis* (Hodges) Stair and Burkholder], bacterial tan spot (caused by *Corynebacterium flaccumfaciens* (Hedges) Dawson], pod and stem blight [caused by *Diaporthe phaseolorum*

(Cke. & Ell.) Sacc. var. *sojae* (Lehman) Wehm.], soybean mosaic virus (SMV) seed mottling, brown stem rot [caused by *Phialophora gregata* (Allington and Chamberlain) W. Gams], downy mildew [caused by *Peronospora manshurica* (Aoum.) Syd. ex Gaum] and powdery mildew (caused by *Microsphaera diffusa* Cke & Pk.). Compared to Pella, Zane is slightly more tolerant to Fe chlorosis, slightly more prone to shattering, much less likely to emerge from deep plantings in warm soil (late plantings) and susceptible to powdery mildew.

Availability

Breeder seed of Zane was distributed to foundation seed organizations in Iowa, Kansas, Kentucky, Missouri, Nebraska, Ohio, and South Dakota for planting in 1984. Certified seed has been available to commercial growers since 1986. Breeder seed is being maintained by the Ohio Agricultural Research and Development Center, Wooster, Ohio 44691. Zane has variety registration number 187 with the Crop Science Society of America and has been granted a Plant Variety Protection Certificate, number 8500059 with Title V protection, restricting it's production as a named variety to classes of certified seed.

Table 1. Comparative yield (bu/a) for Zane and other soybean varieties (ranked by maturity), from the Ohio Preliminary Tests (OPT), and the Advanced Line Tests (ALT), 1979 to 1983.

	OPT		ALT			Means	
Variety	1979 2 tests	1980 4 tests	1981 4 tests	1982 4 tests	1983 3 tests	1980-83 15 tests	1979-83 17 tests
Century	58	54	35	45	42	44	45
Amcor	61	52	38	46	40	44	46
Zane	56	54	38	54	48	49	49
Pella	54	53	38	52	45	47	48
A3127	—	53	39	53	45	48	—
Cumberland	52	52	35	50	44	45	46
Williams 79	54	48	40	49	43	46	47
Williams	—	47	39	48	40	44	—
Williams 82	—	44	42	49	42	46	—

Table 2. Comparative yield (bu/a) for Zane and other soybean varieties (ranked by maturity) by location[1] from the Advanced Line Tests 1980 to 1983.

Variety	OFS, Croton 1980-83	Northwestern Branch, Custar 1980-83	Western Branch, S. Charleston 1980-82	OARDC, Wooster 1980-83	ODNR, Vickery 1980-82
Century	44	45	47	43	42
Amcor	42	43	53	42	43
Zane	46	49	56	48	49
Pella	48	47	54	43	45
A3127	47	51	53	44	50
Cumberland	45	48	50	43	46
Williams 79	44	48	54	40	51
Williams	42	45	51	43	46
Williams 82	41	49	51	42	52

[1] OFS is Ohio Foundation Seeds; Northwestern Branch, Western branch, and OARDC are two branch stations and the main research campus of the Ohio Agricultural Research and Development Center; and ODNR is Ohio Department of Natural Resources station, formerly North Central Branch, OARDC.

Table 3. Comparative yield (bu/a) for Zane and other soybean varieties (ranked by maturity) from the Uniform Soybean Tests, Northern States, 1981 to 1983.

	Regional, Including Ohio				Ohio, only			
Variety	1981 9 tests	1982 25 tests	1983 22 tests	1982-83 47 tests	1981 2 tests	1982 4 tests	1983 4 tests	1982-83 8 tests
Century	47	45	37	41	41	47	39	43
Zane	52	50	41	46	43	54	41	47
Pella	—	49	39	45	—	51	41	46
Harper	—	50	41	46	—	52	41	47
Cumberland	51	49	39	44	49	51	41	46
Williams 82	—	48	39	44	—	47	42	44

Table 4. Comparative yield (bu/a) for Zane and other soybean varieties and strains (ranked by maturity) by location[1] from the Ohio Advanced Line Tests A and B, 1984 to 1986.

Variety or Strain	1984 A & B 3 tests	1985 A 4 tests	1985 B 5 tests	1986 A 6 tests	1986 B 6 tests	1984-86 A 13 tests	1984-86 B 14 tests
Amcor	50	45	41	45	42	46	43
Zane	51	46	46	47	47	48	48
Pella	51	—	43	—	45	—	46
AP330	—	47	48	46	45	—	—
TS350	—	—	48	—	42	—	—
Harper	50	—	—	—	47	—	—
A3127	53	—	48	—	47	—	48
Williams 82	49	—	45	—	48	—	46

[1] In all years tests were conducted at Northwestern Branch, Custar; OARDC, Wooster; and OFS, Croton, Ohio. In 1985, the A test included Auglaize, Ohio; the B Auglaize and Ripley. In 1986, the A test included Vickery, Ohio; Sandusky, Ohio and Auglaize; the B test Vickery, Ohio; Auglaize, Ohio; and Ripley, Ohio.

Table 5. Comparative yield (bu/a) for Zane and other soybean varieties (ranked by maturity) from the Uniform Soybean Tests, Northern States, Maturity Groups II, 1984-86.

Variety	Regional, Including Ohio					Ohio, Only				
	1984	1985	1986	1985-86 Avg.	1984-86 Avg.	1984	1985	1986	1985-86 Avg.	1984-86 Avg.
No. of Tests	—	21	21	42	—	—	2	2	4	—
Elgin	—	47	50	49	—	—	37	45	41	—
Century 84	—	45	50	48	—	—	37	51	44	—
Zane	—	48	51	50	—	—	41	50	46	—

Table 6. Comparative yield (bu/a) for Zane and other soybean varieties (ranked by maturity) from the Uniform Soybean Tests, Northern States, Maturity Groups III, 1984-86.

Variety	Regional, Including Ohio					Ohio, Only				
	1984	1985	1986	1985-86 Avg.	1984-86 Avg.	1984	1985	1986	1985-86 Avg.	1984-86 Avg.
No. of Tests	20	21	19	40	60	4	4	4	8	12
Century 84	—	44	48	46	—	—	41	50	45	—
Zane	46	47	51	49	48	44	46	48	47	46
Pella	43	47	—	—	—	40	46	—	—	—
Harper	45	48	52	50	48	41	46	49	48	45
Williams 82	46	46	—	—	—	49	45	—	—	—

Table 7. Comparative yield (bu/a) for Zane and other soybean varieties and strains (ranked by maturity) by location[1] from the Ohio Soybean Trials, 1983 to 1986.

Variety or	Western Branch S. Charleston		West Central Auglaize		Northwestern Branch, Custar		ODNR, Vickery	Overall Means	
Strain	1983-85	1984-86	1984-85	1984-86	1983-85	1984-86	1984-86	1984-86	1983-86
Century 84	59	61	49	57	52	63	37	60	57
Amcor	—	59	—	56	—	63	37	59	—
FFR 226	61	60	52	57	54	61	—	59	57
Zane	59	60	52	56	53	59	37	59	57
V295	67	64	—	—	53	60	36	—	—
Pella	61	61	56	55	53	60	34	59	58
F3320	60	60	57	59	56	63	36	61	60
V 311	63	63	54	56	56	61	38	60	60
GL3200	—	63	—	55	—	58	—	59	—
A2943	—	66	—	61	—	59	—	62	—
Harper	59	60	49	56	52	59	32	58	56

[1]Western Branch and Northwestern Branch are OARDC branch stations. West Central is an on-farm test site. ODNR is Ohio Department of Natural Resources station, formerly North Central Branch, OARDC.

Table 8. Comparative growth data for Zane and other soybean varieties (in maturity order) from the Ohio Advanced Line Tests, 1980-86, and the Uniform Soybean Tests, Northern States, 1982-86.

Variety	Relative Maturity[1]		Lodging Score[2]		Height (in)	
	Regional Tests 1982-86	Ohio Tests 1980-86	Regional Tests 1982-86	Ohio Tests 1980-86	Regional Tests 1982-86	Ohio Tests 1980-86
Century 84[3]	2.6	2.6	1.5	1.5	32	32
Amcor	—	2.9	—	2.3	—	37
Zane	3.0	3.0	1.5	1.7	33	34
Gnome 85[3]	—	3.1	—	1.4	—	22
Pella	3.1	3.1	1.5	1.6	35	35
Hobbit	3.4	3.4	1.3	1.3	22	23
Harper	3.4	3.4	1.4	1.4	33	30
A3127	—	3.5	—	1.6	—	33
Williams 82	3.9	3.9	1.7	1.9	38	38

[1]Relative maturity scores are composed of whole digit maturity group followed by a decimal which relates to placement in maturity group. Higher scores indicate later maturity.

[2]Lodging scores are based on a 1.0 (100% erect) to 5.0 (100% prostrate) scale.

[3]Gnome 85 and Century 84 substituted for Gnome and Century, rspectively, 1984-86.

Table 9. Comparative phytophthora rot and seed quality data for Zane and other soybean varieties (in maturity order) from the Ohio Advanced Line Tests (ALT), and Uniform Soybean Tests, Northern States (USTNS).

	Phytophthora Rot[1]					Seed[2]			
	Northwestern Branch		Tolerance (score)		Resistance			Composition	
Variety	Yield (bu/a) 1984	Stand (score) 1984	ALT 1983-86	USTNS 1982,84-86		Quality (score) (58) 1984-86	Size (gm/100) (83) 1984-86	Protein % (20) 1984-86	Oil % (20) 1984-86
Century 84	35	2.3	2.7	2.8	R	2.3	17.3	42	20
Amcor	—	—	3.8	—	S	—	.....	—	—
Zane	27	3.9	3.3	3.0	S	2.2	18.8	40	22
Gnome 85	34	1.7	3.0	3.0	R	—	.....	—	—
Pella	12	4.1	2.8	3.0	S	2.1	18.5	39	22
Harper	19	4.5	3.4	3.3	S	2.0	18.7	41	21
A3127	—	—	3.0	—	S	—	.....	—	—
Hobbit	17	4.3	3.5	3.3	S	1.8	15.5	39	22
Williams 82	52	1.4	2.2	1.8	R	1.9	16.4	41	21

[1]Phytophthora rot was severe at Northwestern Branch in 1984 severely affecting stands and yield. Stand and tolerance scores are based on a 1.0 (100% survival and vigor) to 5.0 (100% mortality) scale, a 3.0 score ia a useable level of tolerance and resistant lines usually score 2.8 or lower.

[2]Seed quality scores are based on a 1 (perfect yellow seed cost, freedom from disease and insect damage) to 5 (100%) mottled or damaged seed) scale. Values for Century substituted for Century 84 in 1982 and 1983.

Table 10. Comparative stress and disease data for Zane and other soybean varieties (in maturity order) from the Uniform Soybean Tests, Northern States, 1982-861.

Variety	Fe Chl.	Emerge	Shatter	FL 2	BB	BP	BTS	SMV	DM	PM	PS	PSB	BSR	
													Plants	Stems
	score										%			
Tests	6	5	12	2	1	1	2	5	1	1	5	5	4	4
Century 84	2.6	4	2.6	4.5	1	1.7	2	4	2.5	1	38	28	100	76
Zane	3.3	5	1.7	1.5	1	2.3	3	3	2.0	4	26	27	93	59
Pella	2.6	2	1.4	1.5	1	2.5	4	5	2.0	1	32	23	98	78
Harper	3.4	5	1.4	3.0	1	1.0	3	5	2.0	1	12	16	98	63
Hobbit	3.3	1	1.3	2.5	1	1.0	2	3	1.0	1	14	21	93	72
Williams 82	3.3	4	1.2	3.0	1	1.0	3	4	2.5	1	22	21	95	76

[1]Scores based on 1.0 (no adversely affected plants) to 5.0 (all plants adversely affected) scale. Fe. Chl.=Iron chlorosis; FL=frogeye leaf spot, race 2; BB= bacterial blight; BP=bacterial pustule; BTS=bacterialtan spot; SMV=soybean mosaic seed stain; DM=downy mildew; and PM=powdery mildew; PS=purple stem blight; PSB=pod and stem height; BSR=brown stem rot.